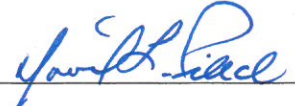


Procedures and Guidelines (PG)

DIRECTIVE NO. 800-PG-8710.0.2C
EFFECTIVE DATE: December 17, 2007
EXPIRATION DATE: December 31, 2020

APPROVED BY Signature: 
NAME: David L. Pierce
TITLE: Director of Wallops Flight Facility

COMPLIANCE IS MANDATORY

Responsible Office: 800/Suborbital and Special Orbital Projects Directorate

Title: Operations in Cold Weather Environments

PREFACE

P.1 PURPOSE

NASA personnel and support contractor employees are frequently called upon to work at locations that have extremely cold weather environments. Some of these areas include, but are not limited to, Alaska, Greenland, and Antarctica. This procedure and guideline has been developed to define cold weather restrictions, which will be applicable to NASA personnel, NASA support contractors, and experimenters who support Code 800 programmatic functions, primarily the Sounding Rocket Program and the Balloon Program.

P.2 APPLICABILITY

Due to the nature of the activities pursued by Code 800, guidelines are necessary to ensure personnel safety and to maintain the quality of on-the-job performance. This guideline is applicable to all operations managed by or under the auspices of Code 800. When Code 800 employees are working under the auspices of other NASA centers, the more restrictive weather policy shall apply.

This guideline is also applicable to support contractors and other directorates when their work duties are to support Code 800 missions. When not supporting Code 800 missions, support contractors having their own Safety and Quality Management System shall use their own policies and guidelines for all efforts within their own facilities.

P.3 AUTHORITY

NPD 8710.2 - NASA Safety and Health Program Policy

P.4 REFERENCES

N/A

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P.5 CANCELLATION

800-PG-8710.0.2B, Operations in Cold Weather Environments

P.6 SAFETY

In extreme cold weather environments, temperatures ranging between -20°F and -40°F are commonplace. At these low temperatures, the most likely injury is frostbite. (At -20°F, frostbite can occur within 30 minutes.) Other potential injuries due to extreme cold weather include hypothermia, muscle strains, and dehydration.

All personnel shall be briefed by the Safety Office prior to performing work in extreme cold weather environments.

P.7 TRAINING

Training may be required by individual launch ranges or basis of operation.

NOTE: If personnel are participating in balloon payload recovery operations in Antarctica they are required to receive the National Science Foundation (NSF) cold weather survival training.

P.8 RECORDS

Record Title	Record Custodian	Retention
Waivers	Office of Waiving Authority	*NRRS 8/5 Permanent. Records may be retired to an FRC when 2 years old. Transfer to NARA 15 years after completion of the project or when 25 years old.

* NRRS – NASA Records Retention Schedule ([NPR 1441.1](#))

P.9 METRICS

N/A

P.10 DEFINITIONS

- a. Frostbite occurs when body tissue freezes due to exposure to a cold environment. Medical treatment is necessary to treat frostbite.
- b. Frost nip is a less severe form of frostbite. Usually, medical attention is not mandatory.

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- c. Hypothermia is the chilling of the body's core temperature below 95°F. Severe hypothermia requires prompt medical attention, or death can result.
- d. Strains are caused by the reduced flexibility of muscles when cold. Also, strains can be induced by the restrictive effects of cold weather clothing.
- e. Dehydration occurs due to the loss of moisture from the body. Dehydration often occurs in winter because people do not feel thirsty or believe that they need to drink water during cold weather.

P.11 ACRONYMS

NSF National Science Foundation

PROCEDURES

In this document, a requirement is identified by "shall," a good practice by "should," permission by "may" or "can," expectation by "will," and descriptive material by "is."

The Director of Code 800 or his designee and the Chief, Safety Office have the authority and responsibility for the implementation of this procedure and guideline.

1. Cold Weather Injury Prevention

Most cold weather injuries affect people who are not properly prepared to handle the temperature to which they are exposed. Adequate dress is sufficient to prevent most cold weather injury cases. For example, unprotected areas of the body are the most vulnerable to frostbite. The face (especially around the cheeks, eyes, ears, and nose) is particularly susceptible. Also, the hands and feet can easily get frostbitten without proper protection. Personnel traveling to Arctic climates during cold weather periods shall be required to have proper dress; this may include an Arctic parka, long underwear (heavy weight), wool socks and polypropylene sock liners, balaclava, gloves and glove liners, and Arctic footwear.

Due to the nature of range operations, much of the time outdoors is spent standing. Standing on the extremely cold ground causes much heat to be lost from the feet. Therefore, personnel shall wear Arctic Pac boots, "Bunny Boots," or equivalent, when working outside in cold weather. Frostbite and frost nip of the facial area can be reduced or prevented by wearing a balaclava or similar protective facial wear. Beards do not constitute adequate facial protection from extremely cold weather exposure. Obviously, limiting exposure to cold weather will reduce the opportunity for injury.

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2. Cold Weather Guidelines for Outside Operations

During range operations the Project Manager, Mission Manager, or Program Manager shall have the responsibility to implement and enforce the following guidelines for outside operations.

- 1) When the wind chill temperature is above 0°F, there are no restrictions on outdoor operations.
- 2) When the wind chill temperature is between 0°F and -19°F, personnel shall take a break every 2 hours.
- 3) When the wind chill temperature is between -20°F and -39°F, personnel will take a break every hour.
- 4) When the wind chill temperature is between -40°F and -50°F, personnel shall only perform duties outside when absolutely necessary, and the exposure duration shall be 30 minutes or less. Convoy travel is required.
- 5) When the wind chill temperature is below -50°F, outside operations shall be discontinued, except for the following circumstances:
 - a. As required by life threatening emergencies.
 - b. As approved by the National Science Foundation (NSF) Office of Polar Operations in support of balloon payload recovery operations. Such operations will occur only when on-site warming facilities or vehicles are available. Also, each individual shall have NSF approved protective clothing; a recent NSF approved medical screening, and have received NSF cold weather survival training. A payload recovery trip plan shall be on file with NSF Operations and the capability for communications with NSF Operations must exist.

Convoy travel is required.

- 6) When the wind chill temperature is below -55°F **and** the actual temperature is below -40°F, single automobile travel is prohibited. Transit personnel must travel in convoys with a trip plan and check in when reaching their destination.

NOTE: In Antarctica, the National Science Foundation (NSF) makes the assessment and approval for vehicular travel during extreme weather conditions. For Antarctica emergency situations, NSF should be contacted first as they will most likely provide transportation and drivers as needed for over the road transiting during such conditions.

NOTE: If emergency travel is required (i.e., employees well being, return to base, etc.,) the Project Manager, Mission Manager, or Program Manager shall be involved in the planning and make every attempt to implement the above precautionary procedures.

There are no restrictions on indoor operations as long as automobile commuting guidelines are followed to get to the work location **and** the work being performed will not create an emergency situation that would require personnel to work outside.

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It is important to remember the "buddy" system when performing any activity where cold or other injuries are a threat. At least two people should always go together when performing activities outside. The additional person can provide assistance for contingencies that may arise during the operation. Also, with two or more people, each individual can look at the others to notice any initial warning signs of frostbite or other injury. However, one must remember that responsibility for protection from injury resides with the individual. In addition to watching others for signs of injury, one must recognize the early symptoms of cold injuries and take measures to prevent the problem from occurring. Cold injuries are more easily avoided than treated. Remember to look for and feel the warning signs, as well as take the necessary precautions to prevent cold injuries from occurring.

In the event of an ongoing storm or other weather condition, especially in low visibility or similar conditions that significantly increase the hazards associated with automobile travel, such travel shall be prohibited. This determination will be made by the Project Manager, Mission Manager, or Program Manager. Travel under these conditions shall only be undertaken in the event of an emergency. If travel is required for emergency operations, travel should be in convoys with a "buddy system" of at least two people in each vehicle. Personnel shall be notified in advance that travel has been cancelled by appropriate mission management personnel.

3. Waivers

The Director of Code 800 or his designee shall have the authority to grant waivers to the requirements as set forth in this procedure and guideline on a case-by-case basis.

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CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	December 20, 2001	Initial Release
A	November 12, 2002	P.7 Training: added the NSF cold weather survival training. Procedures: Section 2, #5b was added to define NSF Polar Operations criteria for working in temperatures below -50° F. Section 3, Waivers: changed Assistant Director for Project Support to the Director of Code 800.
B	February 16, 2005	Modified to clarify requirements in accordance with Center Rules Review recommendations. Updated references from GPGs/NPGs to GPRs/NPRs
C	December 17, 2007	P.7 Added paragraph. Section 2, first sentence removed the word "off-range", changed to "range". Rewrite of subparagraphs (1) through (4) to eliminate an overlap of temperatures. Subparagraph (6) added the word "single" to automobile travel. Added a note for Antarctica. Also added additional paragraph addressing traveling in harsh storms.
	January 15, 2013	Administratively Extended
	January 13, 2014	Administratively Extended (no changes)
	November 20, 2015	Administratively Extended (no changes) while in revision review.
	December 21, 2016	Administratively Extended (no changes)
	June 6, 2017	Administratively Extended (no changes)
	December 13, 2017	Administratively Extended (no changes)
	December 20, 2018	Administratively Extended (no changes)
	December 12, 2019	Administratively extending (no changes) while in revision review.

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